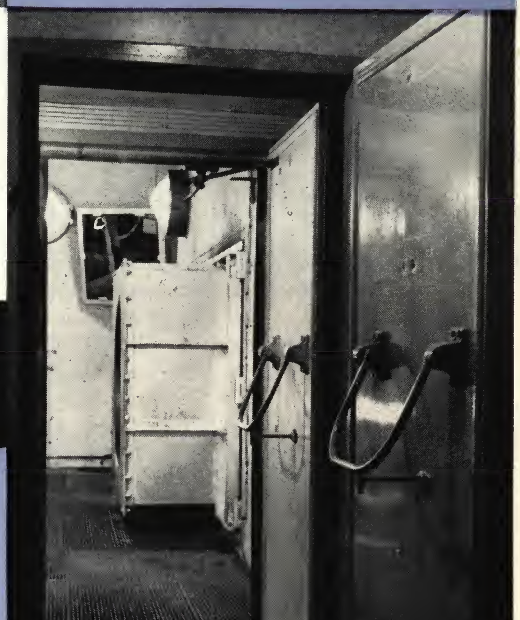
JAMISON

50 db sound reduction doors



doors engineered to solve noise problems at any sound level

Sound Reduction Door Division Jamison cold storage Door Company
Hagerstown, Md., U.S.A.

A I A File No. 16 - F

Jamison offers dependable help in controlling unwanted noise

During the past 30 years, Jamison has acquired invaluable experience in designing and constructing doors which have proved highly efficient in reducing noise to a level tolerated by the human ear. Today, the modern doors engineered by the Jamison Sound Reduction Door Division are successfully insulating the noise in research laboratories; test cells for jet, turbo-prop, and reciprocating engines, quiet rooms for industrial testing; TV studios and anechoic chambers.

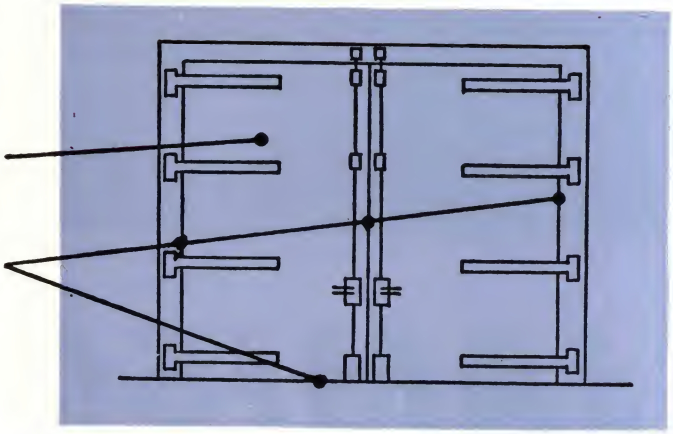
Jamison engineers have thoroughly investigated the problem of unwanted noise, and are today in a position to offer reliable, helpful recommendations in controlling noise problems at practically any sound level. Jamison Sound Reduction Doors—extensively tested in all types of installations—represent maximum effectiveness in both design and construction based on continuing acoustical research.

Jamison 50 db doors give *maximum* sound reduction in two ways

To isolate noise most effectively, the design of a sound reduction door must take into account the two major ways in which sound can pass from the source to outside areas.

1 The door must minimize the transmission of noise through the door structure itself.

2 Effective seals must be provided at the jambs, sill, and the astragal of double doors to prevent noise transmission through openings.



Maximum sound reduction in the door structure proper depends upon the door's ability to absorb sound energy and prevent the fundamental and harmonic frequencies of sound waves from causing vibration. For this reason, all Jamison Doors embody

- The mass principle of sound reduction
- Great rigidity
- Massive vibration proof hardware

Mass principle assures greatest absorption of sound energy.

Tests conducted by the National Bureau of Standards have shown that weight per unit area is the main factor in minimizing sound transmission through a structure. This principle of mass is effectively applied in Jamison Doors by making them 6″ thick and using a completely solid construction with the inside of the door filled with a 4″ thickness of insulation having a density of 13 to 15 pounds per cubic foot. In this way, a maximum amount of sound energy is absorbed and converted into other forms of energy.

This construction, along with the firm support offered by rugged hardware, further decreases the possibility of sound transmission by providing the rigidity needed to prevent vibration. In addition, the hardware itself is vibration-proof.

Gaskets reduce sound transmission at jambs . . . sills . . . astragals.

To minimize sound transmission along the edges, all Jamison Doors are equipped with highly effective gaskets. These seal off the openings at the jambs and sills. In addition, double doors provide extra gaskets at the astragal.

special doors for unusual needs

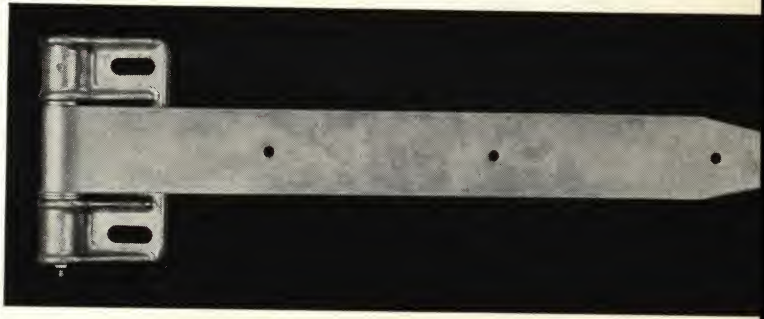
Jamison Doors are regularly supplied as single doors for passage of personnel and as double doors to permit movement of equipment and materiel. Because of their efficiency, these doors usually provide the needed sound reduction when installed as individual units. However, if the noise level at the source is extremely high, or if unusual conditions exist affecting pressure, temperature or humidity, Jamison will gladly make specific recommendations and build the required doors. Complete research, engineering, and manufacturing facilities are at your disposal.

selecting sound reduction doors

Suggested specifications for sound reduction doors are given in this catalog. To assure best possible results, the following information should also be given.

1. Source of the noise and its intensity and frequency range.
2. Kind and thickness of wall construction.
3. The way materiel is to be moved—by trucks, overhead conveyor rails, etc.
4. Extremely high or low operational temperatures.
5. Extreme operational pressures or vacuum.
6. Explosion or emergency panic bar release.
7. Any special operational conditions or security measures.

features of Jamison 50 db doors



Jamison Hinges—Massive steel strap ½" slotted for adjustment of door during installation.

Jamison-built hardware

All of the hardware used on Jamison Sound Reduction Doors is massive and vibration-proof. It contains built-in elements that effectively absorb sound energy. Application of the hardware also assures tight closures and provides firm support for the door. On double doors, each leaf is securely locked to the frame at top and bottom by the Jamison interconnected fasteners. In addition, the active leaf is interlocked to the inactive leaf at two or more points depending on height of the door.

Jamison Interconnected Fastener for double doors. All locking points have adjustments to permit positive gasket pressure for a tight seal.

Jamison-fabricated steel frames

Close dimensional tolerances and correct drilling of the steel frame plays an important part in the operation of Jamison Sound Reduction Doors. Frames fabricated in the Jamison factory assure proper fit of the door because they are built by the same people who make the doors and understand the need for proper fit. Anchors are properly located; drilling done accurately; frames are welded in one piece ready to install in the wall (except in unusual sizes).

all gaskets adjustable for a sound-tight seal

sweeper gaskets

Hinge adjustment assures proper pressure between the edge of the door and the frame when first installed. On double doors this same hinge adjustment permits locating active and inactive leaves for desired gasket pressure in the center.

center compression gasket

Mounted on the inactive leaf it receives pressure from the active leaf of the double door that can be changed by adjustments of the interconnected fastener.

back compression gaskets

Their mounting on adjustable stop angles inside the frame permits accurate locating against the inside edge of the door to give the desired amount of gasket pressure. On double doors the top and bottom fasteners can be adjusted to provide holding pressure against gaskets.

automatic sill seal

The spring pressure that holds the gasket against the sill when the doors are closed can be accurately adjusted to the desired gasket compression.

sill compression gasket

Exclusive sill compression gasket for single and double doors assures sound-tight seal at most critical point.

noise level criteria

For jet engine noise levels, there are two basic problems associated with the noise: first, the effect of noise on hearing loss; and second, the interference of the noise with speech communication.

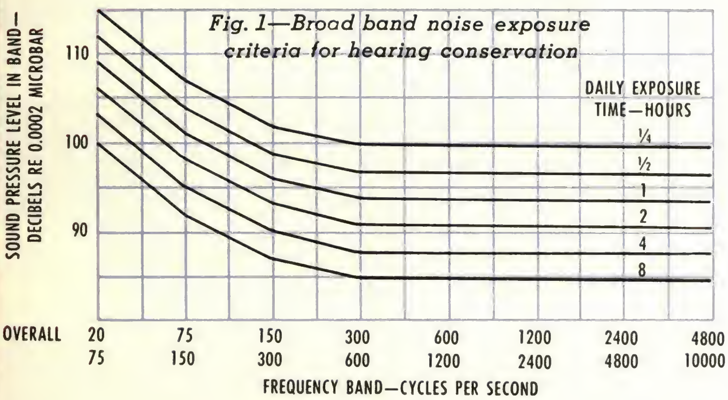


Fig. 1—Broad band noise exposure criteria for hearing conservation

Evidence to date indicates that no significant amount of noise-induced hearing loss will be experienced by the average person for long time exposure to jet engine noise levels no higher than those given by the bottom curve of Fig. 1. A "long-time exposure" means a daily exposure of approximately 8 hours for a normal 5-day work week for a number of years, say 10 to 25. *We will assume that the noise levels to be achieved in working areas outside the test cell should not exceed those of the bottom curve of Fig. 1.*

The noise level values given in Fig. 1 apply to broad band noise only. For noise which contains noticeable discrete frequencies, such as the siren-like whine at the intake of a jet engine compressor, the noise level values of Fig. 1 should be reduced approximately 10 db because the hearing mechanism of the ear is more easily damaged by "pure tone" or discrete frequency signals than by broad band noise having no tonal quality.

noise levels in jet engine test cells

Approximate noise levels within a typical test cell are shown in Fig. 2. The values given represent the average noise levels of several different engines operating at 100% rpm with afterburners in several different test cells. The family of noise level curves are given in terms of the rated engine thrust for free flight operation.

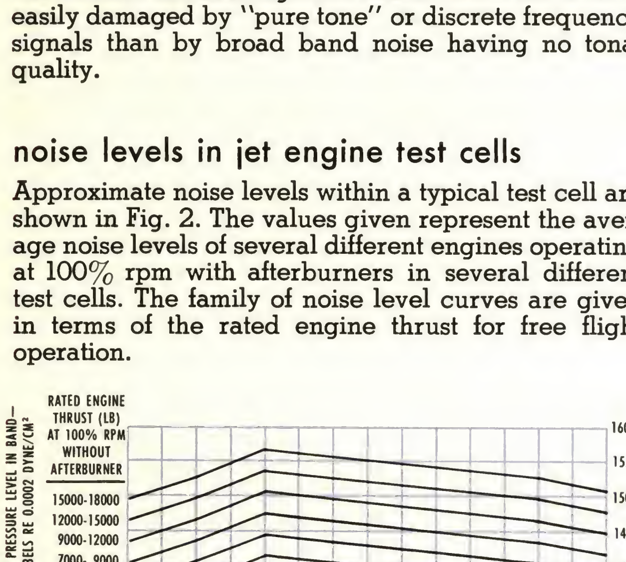


Fig. 2—Approximate noise levels toward rear end of jet engine test cell for engine operating at 100% rpm with afterburner.

speech communication

In many areas near the test cell it is essential for personnel to be able to speak and to be heard in the presence of jet engine noise. The curves of Fig. 3 represent the range of noise levels in which speech communication can be carried on under various conditions. The noise level in the control room beside the test cell *should not exceed* those of the NCA 60 curve of figure 3.

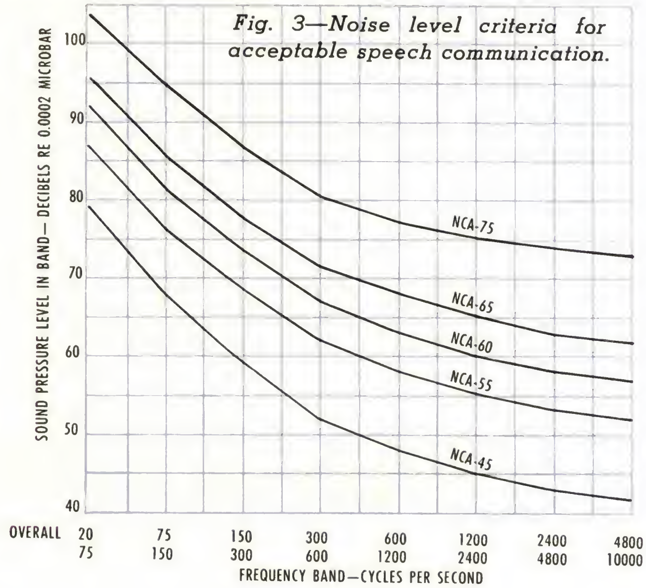


Fig. 3—Noise level criteria for acceptable speech communication.

Average voice levels required in presence of NCA noise levels for reliable speech communication.

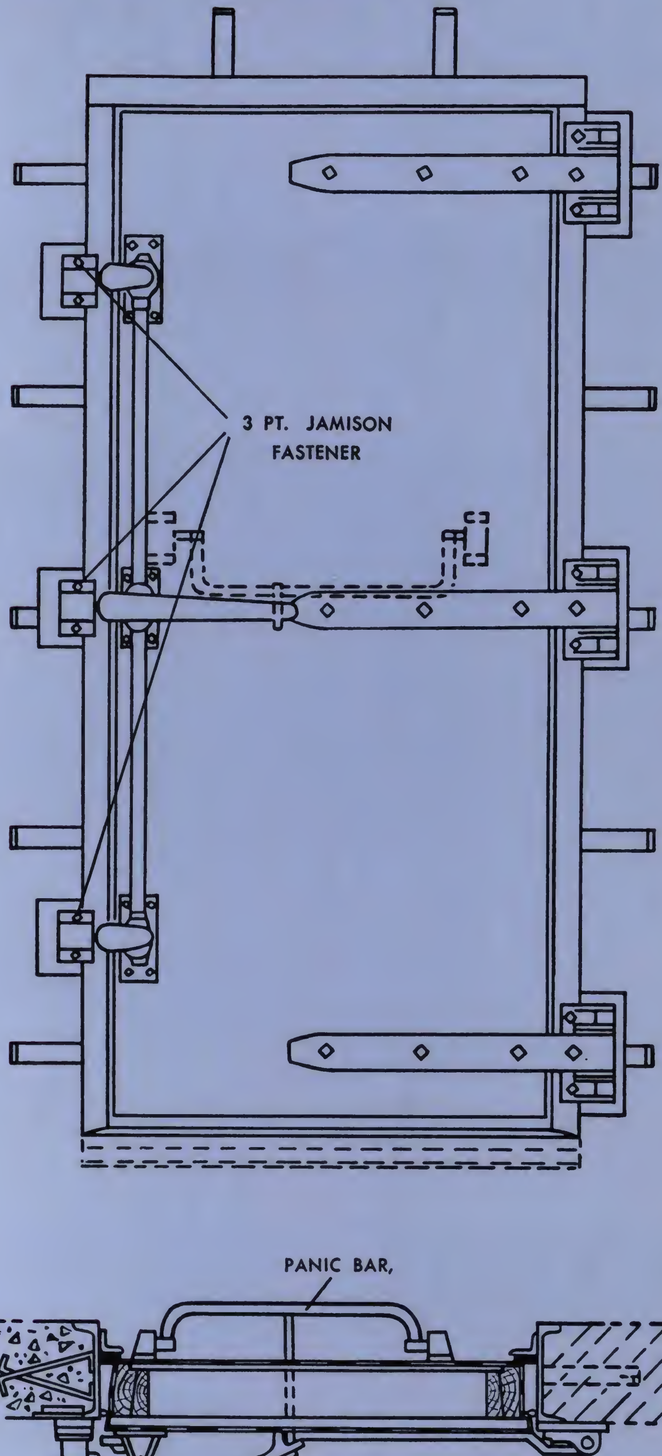
Noise Level Curve of Fig. 3	Approximate Voice Level and Distance
NCA-45	Normal Voice at 2-4 ft., or Raised Voice at 5-10 ft.
NCA-55	Normal Voice at ½-1 ft., or Raised Voice at 2-4 ft., or Very Loud Voice at 5-10 ft.
NCA-60	Raised Voice at 1-2 ft., or Very Loud Voice at 3-6 ft.
NCA-65	Raised Voice at ½-1 ft., or Very Loud Voice at 2-4 ft., or Shouting at 10-20 ft.
NCA-75	Very Loud Voice at 1-2 ft., or Shouting at 3-6 ft.

Required Transmission Loss of a Test Cell Door

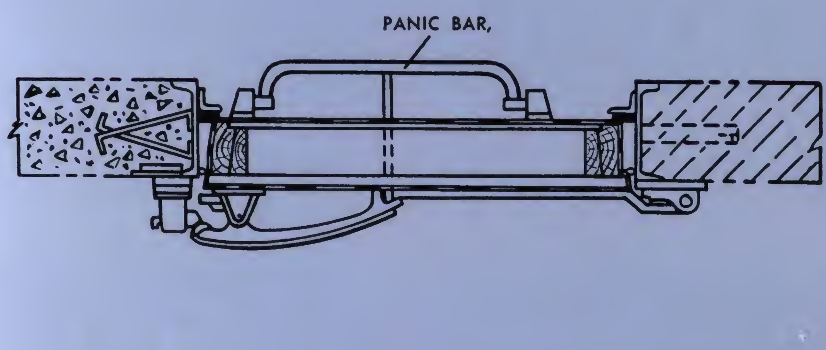
The amount of noise energy transmitted through a solid wall is determined by the area of the wall and the transmission loss of the wall. If the wall contains a door, then the noise energy transmitted is determined by the area and the TL of the door and by the area and the TL of the wall. In a perfectly balanced design, the TL of the door should be the same as the TL of the wall, but there are situations in which this may not be practical.

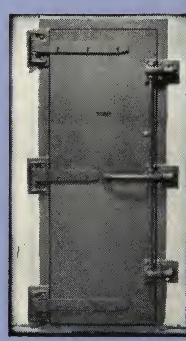
Obviously, it would be of little acoustical value to install a high-TL door of small area in a low-TL wall of large area; for almost all of the noise would be transmitted through the wall and the door would be better than it need be. On the other hand, it is possible to destroy the effectiveness of a high-TL wall by installing a poor door.

Jamison single doors

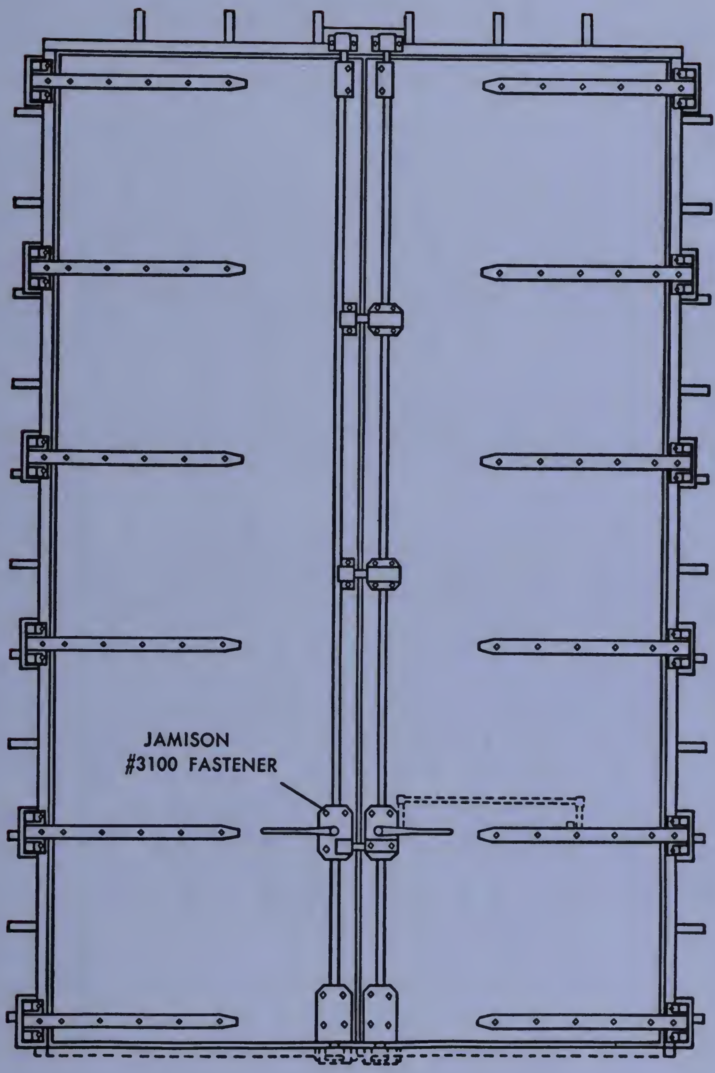


SCALE ¾" = 1'

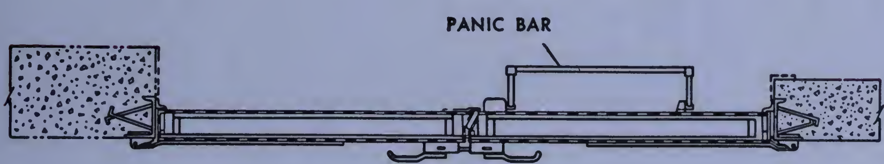


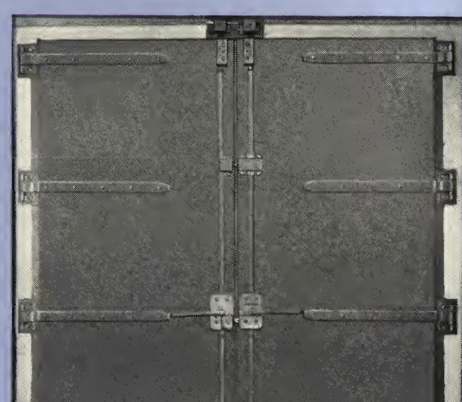


Jamison double doors

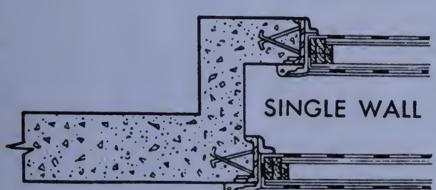


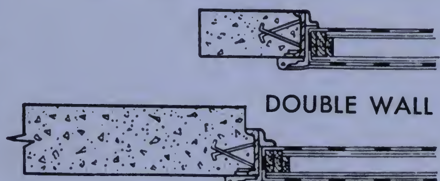
SCALE $\frac{5}{16}'' = 1'$



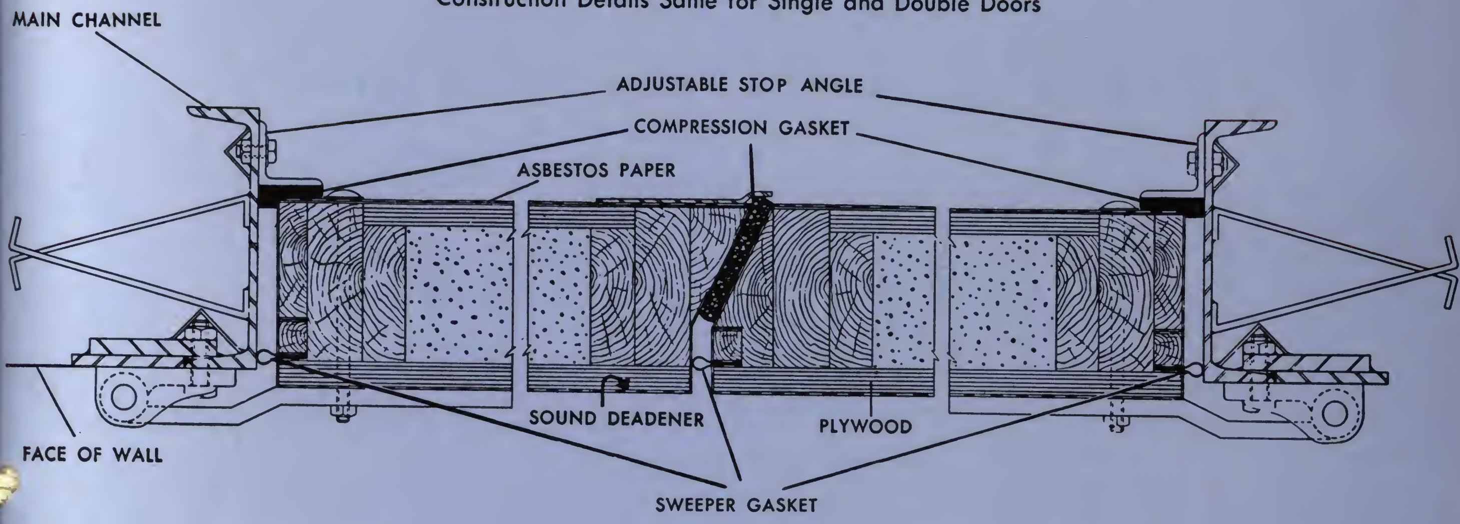


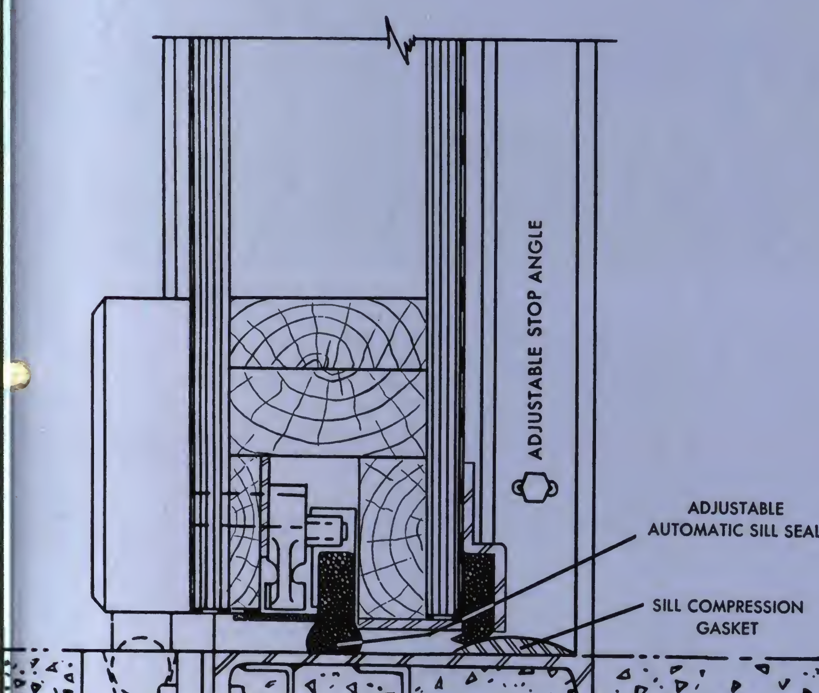
TANDEM DOOR ARRANGEMENTS TO ATTAIN REQUIRED SOUND TRANSMISSION LOSS



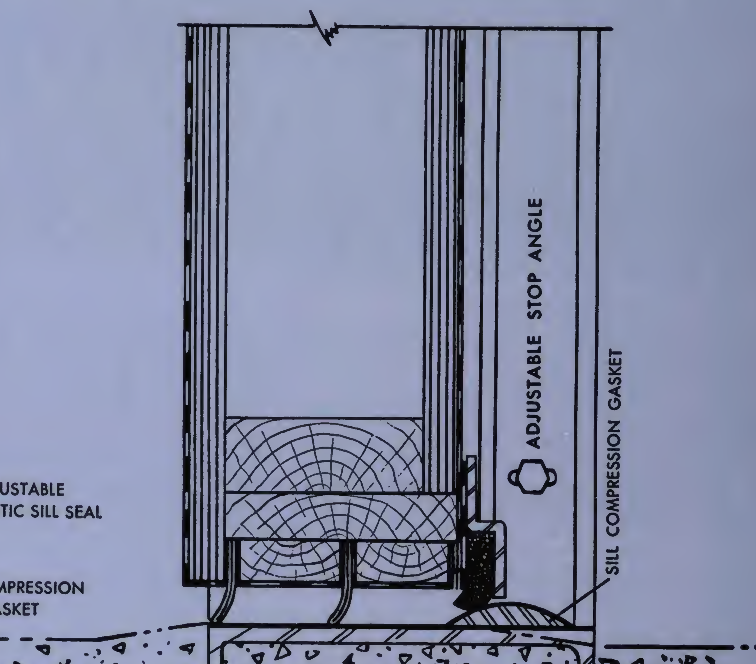


SECTION AT CENTER OF DOUBLE DOOR
Construction Details Same for Single and Double Doors





SILL SECTION FOR DOUBLE DOOR



SILL SECTION FOR SINGLE DOOR

SCALE 3″ = 1′

specifications for the 50 db sound reduction door

Install, where indicated on the plans, sound reduction doors as specified herein and as detailed on the drawings. The doors shall be the product of a recognized manufacturer of doors of this type. All single doors and the active leaf only of double doors shall be provided with panic bar releases. The door manufacturer shall provide the channel frame, sill plate where required, adjustable stops, and all hardware.

The contractor shall furnish to the owner evidence that complete units of the same construction, installed in wall and operable, including doors, frames, gaskets, and hardware, shall have been tested by a nationally recognized laboratory in accordance with "Recommended Practice for Laboratory Measurements of Airborne Sound Transmission Loss of Building Floors and Walls" No. E 90-50T of the American Society for Testing Materials, and found to have an average sound reduction of 50 db for single doors and 49 db for double doors, plus or minus 2 db. The average shall be the result of 11 readings taken at the following frequencies: 125, 175, 250, 350, 500, 700, 1000, 1500, 2000, 3000 and 4000 cps. (Give specific sound reduction requirements if available.)

All material shall be guaranteed for one year after shipment against defective workmanship or materials.

Jet test cell applications range from 23,000 pounds thrust for Orenda to 1,000 pound thrust for Fairchild.

typical installations

AIRLINE SERVICE FACILITY
Capital Airlines, Washington, D. C.
TWA Mid-continent Airport, Kansas City, Mo.

ARMED FORCES SERVICE FACILITY
Olmstead A.F.B., Middletown, Pa.
Tinker A.F.B., Oklahoma City, Okla.
Kelly A.F.B., San Antonio, Texas
Norton A.F.B., San Bernardino, Calif.
Banana River Naval Air Station, Melbourne, Florida
Engine Overhaul & Test Bldg., Quonset Point, R. I.
U. S. Naval Air Station, Engine Test Cells, Lakehurst, N. J.
Cunningham Field, Cherry Point, N. C.
Wright Field, Dayton, Ohio
Torque Bldg., Wright Field, Ohio
Propeller Test Torque Stand, Wright Field, Ohio
Rome Air Depot, Engine Test Bldg., Rome, N. Y.
Naval Air Station, Flour Bluff, Corpus Christi, Texas
Georgia Air Depot, Supply Bldg. #41, Wellston, Ga.
U. S. Naval Air Station, North Island, Calif.
Engine Test Bldg., Hill Field, Ogden, Utah
Add'n to Engine Test Bldg., Patterson Field, Fairfield, Air Depot, Osborn, Ohio
Southeast Air Depot, Engine Test Bldg., Mobile, Ala.
Engine Test Facility, Edwards A.F.B., Calif.
Cape Canaveral Auxiliary A.F.B., Florida

MANUFACTURERS TEST FACILITY
Ford Motor Co., Lincoln Plant, Detroit, Mich.
Continental Motors Corp., Muskegon, Michigan
Curtiss-Wright Corp., Propeller Division, Bloomfield, N. J.
Wright Aeronautical, Woodbridge, N. J.
Fairchild Engine Division, Farmingdale, L. I., N. Y.
Packard Motor Co., Detroit, Mich.
General Motors Corp., Aeroproducts Div., Vandalia, Ohio
Orenda Engines, Ltd., Canada
DC-8 Thrust Stand, Douglas Aircraft, Calif.
Wind Tunnel, Convair, Calif.

TEST LABORATORIES
Westinghouse Electric, Kansas City, Mo.
Stromberg Carlson Laboratory, Rochester, N. Y.
Supersonic Wind Tunnel, U. S. Army, Aberdeen, Md.
Detroit Tank Arsenal, Detroit, Michigan
N. A. C. A. Langley Field, Va.
Aircraft Engine & Research Lab., Cleveland, Ohio
Engine Test Torque Stand Bldg., Wright Field, Ohio
Chrysler Tank Arsenal, Detroit, Mich.
Aeronautical Research Laboratory, Wright-Patterson A.F.B.

MUSIC STUDIOS
Capitol Record Co., Los Angeles, Calif.
WBAY-TV, Green Bay, Wis.
TV Studios, Denver, Colorado Public Schools
NBC Color TV Studio, Brooklyn, N. Y.

ANECHOIC LABORATORIES
Douglas Aircraft, California
University of Pittsburgh

STEAM OR ELECTRIC TURBINE INSTALLATIONS
Delaval Steam Turbine Co., Trenton, N. J.
Municipal Light & Power Co., Cushing, Okla.

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